

Instructional Principles for Online Learning

Shujen L. Chang
University of Houston Clear Lake

Abstract

Four instructional principles for alleviating cognitive overload in online learning are suggested: 1) Guide learners to prepare and maintain an effective workstation for accessing online materials, 2) Employ advance organizers for effective online navigation, 3) Arrange instructional materials for easy online manipulation, and 4) Organize instruction to facilitate learners toward developing personal cognitive strategies for meaningful interpretation. This article concludes that these instructional principles should be empirically examined about their effects on online learning achievement.

Introduction

Advanced technologies such as the Internet and World Wide Web are changing the nature of online learning processes (Hartley, 1999; Hill, 1997; Land & Hannafin, 1996; Wolfe, 2001). Online learning processes involve more processes than that in traditional learning. For examples, recognizing hyperlinks, accessing electronic materials, and navigating online materials are the online learning processes that do not exist in the traditional learning. Also, it is noted that greater cognitive load is required for online than traditional learning (Britt & Gabrys, 2001; Hill, 1997; Hill & Hannafin, 2001; Yang, 2001). The existing well-established and widely-adopted instructional principles are mainly for traditional classroom instruction (Gagne, Briggs, & Wager, 1992; Reigeluth, 1983). Unfortunately, these principles are inappropriate for online learning because they seem fall short in addressing the additional online learning processes or the cognitive overload phenomenon. New instructional principles that take into consideration of these additional processes and can alleviate cognitive overload phenomenon are necessary for ensuring the effectiveness of online learning.

Purpose

The purpose of this paper is to suggest instructional principles for facilitating online learning. Instructional design for effective online learning should encompass features that can moderate the cognitive overload phenomenon in online learning. This paper will propose four instructional principles that can be embedded in instruction to reduce cognitive overload in online learning regardless of content or a specific population. They can be systematically employed in 100% or hybrid web-based instruction with synchronous or asynchronous communications.

Instructional Principles for Online Learning

The suggested four instructional principles for online learning are:

1. Guide learners to prepare and maintain an effective workstation for accessing online materials
2. Employ advance organizers for effective online navigation
3. Arrange instructional materials for easy online manipulation
4. Organize instruction to facilitate learners toward developing personal cognitive strategies for meaningful interpretation

Principle 1: Guide Learners to Prepare and Maintain an Effective Workstation for Accessing Online Materials

Instruction should first guide learners to set up or find an effective and stable workstation that meets technical requirements for online learning. Successful learners make efforts to arrange a functioning learning environment for study (Trawick & Corno, 1995) and instruction should guide learners to prepare an appropriate learning environment (Ley & Young, 2001). In addition, instruction should prepare learners for maintaining an effective workstation for online learning. Online learners often find themselves in a situation of solving technical problems, which becomes a serious problem especially for less experienced online learners (Althaus, 1997; Grantham & Vaske, 1985; Hiltz, 1993; Kooley, Kelsey, & Lindner, 2003). The need of supporting technical problem solving is widely recognized (Althaus, 1997; Garland, 1993). Instruction should provide information of technical help facilities within or outside the institute that learners can seek for help.

Principle 2: Employ Advance Organizers for Effective Online Navigation

Instruction should provide advance organizers that clearly indicate the locations of pertinent documents to guide learners in searching online materials within a course website. The effectiveness of navigating nonlinear online materials can be enhanced by providing advance organizers at the beginning of a course website, such as providing principles for navigating hypertext (Shapiro, 1998), showing a map of the structure of hypertext (Jonassen, 1998), and presenting materials in a list format with less-step hyperlinks, or low link densities, to produce the best overall search results (Khan & Locatis, 1998). Once learners have a clear picture of the locations of pertinent documents or have the ability to accurately locate specific documents within course websites, the complicated navigation task (Eveland & Sharon, 2000; Niederhauser, Reynolds, Salmen, & Skolmoski, 2000; Shapiro, 1999) becomes easier and chance of getting lost in cyberspace (Conklin, 1987; Marchionini, 1988; McAlees, 1989; Nielsen, 1990) becomes lower. As a result, learners can easily initiate online learning activities with less cognitive resources in navigating online materials.

Principle 3: Arrange Instructional Materials for Easy Online Manipulation

Instruction should arrange materials for easy online manipulation and proper displays on computer screens. The amount of the materials displayed on a web page should either avoid being too long or be constrained within the display size. With properly arranged online materials for easy online manipulation, the construction of text-based mental model will require less cognitive load and the development of or shifting to online learning style will be smoother. As a result, cognitive resources required for manipulating online materials may be moderated.

Principle 4: Organize Instruction to Facilitate Learners toward Developing Personal Cognitive Strategies for Meaningful Interpretation

Instruction should incorporate cognitive strategies to guide learners in constructing meaningful interpretation from nonlinear online materials. Cognitive strategies are various methods that learners use to guide their own learning, thinking, acting, and feeling (Driscoll, 2000). The positive effects of employing cognitive strategies on constructing meaning from learning materials, such as showing a concept map of the whole text at the beginning is considered a good hypertext (Jonassen, 1998) and signaling the structure of text is viewed crucial to comprehending hypertext (Meyer, 1985). Guided by cognitive strategies, learners can gradually develop the ability to construct meaningful situation models for meaningful interpretations. Thus, the cognitive overload associated with constructing meaningful situational models can be alleviated.

Conclusion

This paper suggests four instructional principles for facilitating the online learning processes. These four principles should be able to alleviate the cognitive overload phenomenon in online learning. Future studies should empirically examine the effects of these four instructional principles on online learning achievement to assess their contribution to online learning and instruction.

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